Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) ~~Device~~ A device for the heat insulation of at least one underwater pipe (1) intended to be laid on the sea bed at great depth, comprising an insulating coating surrounding the latter and a protective envelope (3), characterized in that said insulating coating comprises a virtually incompressible liquid/solid phase change material (4) with a melting temperature T_0 higher than that T_2 of the medium surrounding the pipe in operation and less than that T_1 of the effluents circulating in said pipe, which protective envelope (3) is resistant and deformable and ensures a containment about said insulating coating, said protective envelope being deformable to follow variation in volume of the insulating coating that it contains under the effect of hydrostatic pressure and variation in temperature.

2. (currently amended) ~~Heat insulation~~ The device ~~according to~~ of claim 1, ~~characterized in that~~ wherein said insulating coating comprises an absorbent matrix (2) surrounding said pipe (1), preferably nearest its outer surface, and impregnated with said material (4).

3. (currently amended) ~~Heat insulation~~ The device ~~according to~~ of claim 1, ~~characterized in that~~ wherein the protective envelope (3) abutting on the material (4) which is solidified and rigid at least on its periphery, is adapted to support the weight of the pipe (1) and the frictions when the latter is laid from the surface.

4. (cancelled)

5. (currently amended) ~~Heat insulation~~ The device ~~according to~~ of claim 1, ~~characterized in that~~ wherein the protective envelope (3) comprises at least one vent permeable to the gas that may diffuse though said underwater pipe (1) and generated by the effluents which circulate therein.

6. (currently amended) ~~Device according to~~ The device of claim 2, ~~characterized in that~~ wherein the matrix (2) is constituted by a ~~light, cellular or fibrous~~ material having at least one characteristic selected from the group consisting of being light, cellular and fibrous and said virtually incompressible material (4) which impregnates it has a melting temperature (T_0) included between 20 and 80°C.

7. (currently amended) ~~Device according to~~ The device of claim 1, ~~characterized in that~~ wherein said material (4) has a thermal conductivity less than 0.3 Watt/meter/degree Celsius in solid phase and an enthalpy of fusion greater than 50 kilojoule/kilogram.

8. (currently amended) ~~Insulation~~ The device ~~according to~~ of claim 2, ~~characterized in that~~ wherein said matrix (2) occupies only a part of the volume of the annular space defined by said protective envelope (3) and said pipe (1).

9. (currently amended) ~~Device according to~~ The device of claim 1, ~~characterized in that it comprises~~ further comprising distance pieces (9) regularly spaced apart along the pipe (1) on which they abut and supporting the protective envelope (3).

10. (currently amended) ~~Device according to~~ The device of claim 1, ~~characterized in that~~ wherein the protective envelope (3) is made of thermoplastics material.

11. (currently amended) ~~Device according to~~ The device of claim 1, ~~characterized in that~~ wherein said virtually incompressible material (4) is constituted, to at least 90%, of chemical compounds of the family of alkanes.

12. (currently amended) ~~Device according to~~ The device of claim 11, ~~characterized in that~~ wherein said virtually incompressible material (4) comprises a paraffin comprising a hydrocarbon chain with at least 14 carbon atoms.

13. (currently amended) ~~Heat insulation~~ The device ~~according to~~ of claim 1, ~~characterized in that~~ wherein the outer perimeter (24) of the transverse section of said protective envelope (3) is a closed curve of which the ratio of the square of the length over the surface that it defines is at least equal to 13.

14. (currently amended) ~~Device according to~~ The device of claim 12, ~~characterized in that~~ wherein the outer shape of the transverse section of said protective envelope (3) is an oval.

15. (currently amended) ~~Device according to~~ The device of claim 14, ~~characterized in that~~ wherein the ratio of length of the large axis over that of the small axis of the oval is at least 2.

16. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the outer shape of the transverse section of said protective envelope (3) is a rectangle.

17. (currently amended) ~~Device according to~~ The device of claim 16, ~~characterized in that it comprises~~ further comprising at least two pipes (1) disposed along the same plane and the transverse section of said envelope (3) is of a shape elongated in the same direction as ~~this~~ said plane.

18. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the perimeter (24) of the transverse section of said envelope (3) comprises concave reversed curvatures (35).

19. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that it comprises~~ further comprising a wear plate (21) disposed on a part of said outer perimeter (24) of the envelope (3).

20. (currently amended) ~~Device according to~~ The device of claim 19, ~~characterized in that~~ wherein said wear plate (21) is disposed along one of the large sides of the transverse section of said envelope (3).

21. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the ratio of the square of the length of the outer perimeter (24) of the transverse section of said protective envelope (3) on the surface that said perimeter defines is at least equal to 16.

22. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the protective envelope (3) comprises a lower "U"-shaped part (3_1) in which are disposed said pipes (1) and a lid (34) assembled on this envelope (3).

23. (currently amended) ~~Device according to~~ The device of claim 22, ~~characterized in that~~ wherein said lid (34) is seam-welded.

24. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the protective envelope (3) comprises a lower "U"-shaped part (3_1) in which are disposed said pipes (1) and an upper opening closed by a layer (31) of supple material cast after installation of all the internal components.

25. (currently amended) ~~Device according to~~ The device of claim 13, ~~characterized in that~~ wherein the envelope (3) comprises shims (27) supporting the insulating

coating (2), the space included between the envelope (3) and said coating (2) being filled with a virtually incompressible fluid ~~(4)~~.

26. (currently amended) ~~Process~~ A process for the heat insulation of at least one underwater pipe (1) intended to be laid on the sea-bed at great depth, using an insulating coating surrounding said pipe and a protective envelope (3), characterized in that:

said pipe (1) is surrounded, preferably directly, with an insulating coating (2) comprising a virtually incompressible, liquid-solid phase change material (4) with a given melting temperature T_0, said incompressible material preferably being impregnated in an absorbant matrix, and the whole is contained in the protective envelope (3) which must be resistant and deformable, there are made to circulate in said pipe (1) hot effluents (6) at a temperature T_1 higher than the melting temperature T_0 of said material (4) while the ambient outside temperature T_2 is less than T_0, the phase change material (4) then being liquefied, preferably in a part of the impregnation matrix (2_1) from the pipe (1) up to a limit of heat exchange equilibrium (19) between the pipe (1) and the envelope (3), beyond this limit (19) the material being solid, when the circulation of the effluents (6) in the pipe (1) is stopped, the temperature of these effluents (6) is maintained above a given temperature T_3 for a predetermined duration thanks to the heat transfer brought by the latent heat of solidification of said material (4) of which the liquid part (4^1) solidifies progressively on cooling.

27. (currently amended) ~~Process~~ The process of ~~heat insulation according to~~ claim 26, ~~characterized in that~~wherein:

an obturator (7_2) is fixed in continuous and tight manner at the end of the outer wall of pipe (1) to be insulated; and

there are mounted on this part of pipe (1), elements of the absorbent matrix (2) which surround the latter completely and uniformly, there is fitted around these matrix elements (2) the outer protective envelope (3) which is connected at its end to the obturator (7_2), there is positioned at the other end of the protective envelope (3) a second obturator (7_1) which is fixed on this envelope and on the pipe (1), the annular space included between the pipe (1) and the envelope (3) is completely filled, via one end, with said phase change material (4) liquefied and overheated above its melting temperature T_0 and until the matrix elements (2) are completely impregnated with it, the whole is cooled.

28. (currently amended) ~~Process~~ The process of ~~heat insulation according to~~ claim 29, ~~characterized in that~~wherein:

there are interposed between absorbent matrix elements (2), distance pieces (9) regularly spaced along the pipe (1) on which they abut, when all the elements of the protective element (3) have been placed in position and fixed to constitute the containment envelope, straps (17) for holding said distance pieces (9) plumb are placed in position, the annular space is then filled with said liquefied material (4) under pressure in order to deform the outer envelope (3) between said straps (17), which deformation corresponding to the increase in volume generated by the thermal expansion of the material (4) liquid at filling temperature.

29. (currently amended) ~~Device according to~~ The device of claim 11, wherein said incompressible material (4) is a paraffin comprising a hydrocarbon chain with at least 10 carbon atoms.

30. (currently amended) ~~Device according to~~ The device of claim 1, wherein said at least one underwater pipe is disposed on said sea bed.

31. (New) The device of claim 1, wherein said envelope is capable of varying up to about 20% by volume.